THE EFFECT OF CERTAIN EXPERIENCES ON DIVERGENT THINKING

By

EDMUND ELMER ALLEN

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CHAPTER I

INTRODUCTION

Statement of the Problem

The general purpose of this study is to gain some insight into whether different intellectual or emotional experiences differentially facilitate or inhibit divergent thinking. It is not the purpose of this study to locate, measure, describe, or develop methods for the training of the creative thinker. Previous research efforts have already developed instruments to measure creativity and to differentiate the divergent thinker from the convergent thinker. Industry has specialized in identifying the creative individual and promoting his permanent growth in this area. These related studies have been elaborated in the following section of this paper.

The reader's attention is directed to Appendix H for definitions and specialized meanings of the technical terms of this paper.

In a pilot study of this problem, using a sample of two high school, two junior high school, and two elementary school students, an effort was made to differentiate the effect of three intellectual experiences: (1) a memory task; (2) a convergent thinking task; and (3) a divergent thinking task on contiguously associated divergent tasks. Although the null hypothesis (that no significant difference existed) could not be rejected at the .05 level, it was believed that more sophisticated research with a larger sample would produce significance. It was observed that when two divergent tasks were contiguously paired, the first task was consistently rated by the judges as more creative than the subsequent divergent task or any divergent task preceded by a memory or a convergent task. Since this held true in eight of the ten instances considered, it appeared that divergent thinking would be generally more creative when not preceded by any form of intensive intellectual operations. It was also noted that performance on a figural type divergent task was inhibited less by a preceding divergent task than by a preceding memory or convergent task. This led to a hypothesis that some divergent tasks would be influenced differentially by different forms of preceding or intervening intellectual or emotional experiences.

Before describing the divergent tasks selected, it is appropriate to communicate what meaning is being attributed to divergent thinking.

Getzels and Jackson (8), in their differentiation of the highly creative and highly intelligent, clarify the concept of divergent thinking as follows:

> Various terms have been used to describe the two processes. Guilford has suggested "convergent thinking" and "divergent thinking"; Rogers uses "defensiveness" and "openness"; Maslow "safety" and "growth." Whatever terms are used, it is clear that one process represents intellectual acquisitiveness and conformity, the other, intellectual inventiveness and innovation. One focusses on knowing what is already discovered, the other focusses on discovering what is to be known.

Guilford (11), in orienting his reader states:

> The unique feature of the divergent production is that a variety of responses is produced. The product is not completely determined by the given information.
>
> In divergent-thinking operations we think in different directions, sometimes searching, sometimes seeking variety.

Torrance (21) reports that Guilford's (1960) conceptualization of creativity includes, in addition to divergent thinking, "redefinition abilities" and "sensitivity to problems." Thus it can be seen that although divergent thinking is the primary component of creativity the two terms are not synonymous or interchangeable.

It is in the frames of reference of Roger's "openness," Guilford's "searching," and Maslow's "growth" that divergent thinking is believed to have become important to the educator, the teacher, and the counselor. Consequently, it is this composite meaning that is adopted for this dissertation.

In the selection of "Divergent Tasks" for this research, the results of the factor analysis of the intellect by Guilford (11) were consulted, and those tasks considered most applicable to the intellectual processes of a client in counseling or a student in the classroom were chosen; i.e., spontaneous flexibility, ideational fluency, associational fluency, expressional fluency, and word fluency.

The intervening variables constituting the selected "Experiences" for this research study were: a positive experience, a negative experience, a memory experience, and a reorienting divergent experience.

It is in terms of these "Divergent Tasks" and "Experiences," as elaborated in Chapter II and Appendices A and B, that the following hypothesis is made.

Hypothesis

There is a significant difference in the creative product of divergent tasks (spontaneous flexibility, ideational fluency, associational fluency, expressional fluency, and word fluency) both individually and collectively derived from the effect of intervening (positive, negative, memory, and reorienting divergent) experiences.

Hypotheses as to the direction of these effects are that memory and negative experiences inhibit, while positive experiences facilitate divergent thinking. An intervening reorienting divergent experience may either facilitate or inhibit the primary divergent task depending on the degree of similarity of reorienting characteristics of the "Experience" relative to the "Divergent Task."

Related Studies

Guilford (11), following the lead of L.L. Thurstone's factor analysis of the thinking process, conducted a factor analysis of intellect under the auspices of the Office of Naval Research Project on Aptitudes of High Level Personnel. A product of this project was the theoretical model for the "Structure of Intellect," described in Chapter II. Taking the criteria structured by the model, Christensen and Guilford (4), and Wilson, et. al. (23) developed and standardized the divergent thinking tests of the form used in this dissertation to measure the creative product of the sample.

During the mid 1950's researchers began to search for personality correlates of divergent thinking. In 1957 Barron (1) published one of the first reports which utilized Guilford's "Unusual Uses," "Consequences," and "Plot Titles B" plus five other tests of originality, including the Rorschach O+ scores and ratings of the T.A.T. stories. The sample consisted of United States Air Force captains (mostly husbands and fathers) who were also tested on two hundred personality assessment variables including those of the Minnesota Multiphasic Personality Inventory, Strong Vocational Interest Blank, and Rorschach. Partialling out verbal intelligence, Barron (1) arrived at significant correlations between the originality scores and the personality variables as grouped below:

Integration of diverse stimuli	.31 to .52
Energy, fluent output and involvement	.28 to .49

Personal dominance and self-assertion	.29 to .47
Responsiveness to impulse and emotion	.38 to .40
Femininity of interest expressed	-.31 to+.33
General effectiveness of performance	.34 to .39

Barron (1) reports significance at the .01 level.

Drevdahl and Cattell (5) performed a much simpler experiment to obtain the personality correlates of creativity and determined that on eleven out of the sixteen factors of the 16 PF, artists and writers were found to be significantly different from the general population. The artists and writers were more intelligent, emotionally mature, dominant, adventurous, emotionally sensitive, bohemian, radical, and self-sufficient. They were prone toward higher tension levels and lesser cyclothymia and external controls.

Temperament aspects of personality were considered in the predictive committee report of the 1957 Utah Conference (2). Dimensions considered worthy of investigation in the search for correlates of creativity were:

Stability - instability
Impulse expression - impulse suppression
Socialization - asocialization
Independence - conformity
Energy - lethargy
Extroversion - introversion
Dominance - submission
Complexity - simplicity
Esthetic - practical orientation

Under the headings of motivation and drives, the committee directed attention to:

Inquiringness of mind

Intellectual persistence

Need for complex order

Tolerance for ambiguity

Need for problem mastery

Need for variety

Need for closure and resistance to premature closure

Need for autonomy

Need for cosmic involvement

In 1961 Guilford, et al. (9) reported that tests designed to indicate "perseveration" in thinking regardless of direction had a negative relationship to the intellectual factor previously identified as "spontaneous flexibility" in thinking. Tests designed to indicate "persistence in one direction" of thinking in solving problems had negative relationships to the factor previously identified as "adaptive flexibility."

Since spontaneous and adaptive flexibility refer respectively to divergent thinking of various classes of ideas and to ideas within one class, the relationships discussed in the previous paragraph are as expected.

The authors classified both "perseveration" and "persistence in one direction" in thinking as personality variables. Interests were also explored as correlates of creativity. The interest variables were identified as interest in: meditation, problem solving, self-enhancement, convergent thinking, divergent thinking, and avoidance of ambiguity. The authors differentiated between interest and ability; for example, an intense interest in divergent thinking was not necessarily related to a high proficiency therein.

As an extension on this research, Merrifield, et. al. (15) attempted to determine the interrelationship between these personality and interest variables and the intellectual factors (primary aptitudes) of Guilford (11). The primary aptitudes considered included divergent thinking. The Merrifield effort was relatively unsuccessful since the highest correlations obtained were less than 0.30, and they were found to be significant only for ideational fluency and originality. Ideational fluency was found to be correlated positively with such personality variables as impulsiveness, self-confidence, ascendency, and appreciation of originality. Ideational fluency was found to be correlated negatively with neuroticism. Originality was correlated with interest in aesthetic expression, interest in meditative thinking and interest in divergent thinking. Originality was also correlated with the personality variable, tolerance for ambiguity.

Relationships which did not reach significance were:

Associational fluency - tolerance for ambiguity, likes risks

Expressional fluency - impulsive, interest in meditative thinking, and aesthetic expression

Word fluency - need for freedom

The correlation previously reported by Guilford, et al. (9) between adaptive flexibility and "persistence in one direction" of thinking was not repeated.

From the previously discussed studies, it can be noted that the approach to creativity has changed from isolated pure research on creativity to concern for such correlates as the personality and interests of the individual.

By referral to learning theory, some insight into the possible temporal effects of intellectual activities on divergent thinking can be gained. In a classical experiment, Duncan (13) demonstrated that learning in rats continued subsequent to the completion of practice trials. Convulsive shock was administered to the rats after practice to terminate the perseveration of neural traces. As the interval between the practice and the shock was decreased from fifteen minutes to twenty seconds, the total learning was also decreased. Shock one hour after the practice trial did not cause a significant learning decrement. Thus, in the case of learning by rats, it is implied that neural perseveration continued for approximately fifteen minutes. The concern of this dissertation is whether or not intellectual or emotional "Experiences" would result in a similar decrement in contiguously associated thinking in human beings.

Guilford, et. al. (9) made a step in this direction in their finding that "perseveration" inhibits at least one form of divergent thinking (spontaneous flexibility) proportionate to the general perseveration in thinking of the individual. How much similarity exists between Guilford's and Duncan's use of the term perseveration is difficult to determine.

The studies next to be discussed are concerned with whether creativity and intelligence are synonymous.

Getzels and Jackson (8), working with gifted children,explored the relationships among creativity, high I.Q. scores, high morality, and high personality adjustment. In this research the highly creative individuals were operationally defined as those who were in the upper 20 per cent on creativity tests, but who were in the lower 80 per cent on I.Q. tests. The high I.Q. individuals were defined as those who scored in the top 20 per cent on the I.Q. test, but who scored in the lower 80 per cent on the creativity tests. It was reported that the highly creative had experienced relatively permissive family relationships during their maturation which were conducive to divergence in thought and behavior with any consequent risk being knowingly accepted by the parents. Less anxiety prevailed in this family milieu. Individuals in the high I.Q. group were characteristically exposed to a home environment which had been more rigid, more restrictive, and more oriented toward success (academic, social, and/or economic). Getzels and Jackson's (8) research validated in the classroom Guilford's (11) conclusions that convergent and divergent thinking were different aptitudes.

Levy (12), from his review of the literature on creativity, concludes that creative persons seek out and live with tension and conflict. This does not appear to coincide with Getzels and Jackson's (8) statement that the home of the creative thinker is characterized by freedom from anxiety. A possible explanation could be that a mild negative experience creates a facilitating force, while a strong negative experience creates an inhibiting force.

Results similar to those of Getzels and Jackson (8) were reported by Burkhart (3) from his work with a sample composed of art students. He found that the divergent thinker scored high on abstract thinking, and ideational and perceptual openness, while the convergent thinker scored higher on concrete thinking and lower on ideational and perceptual openness. The divergent thinker as exemplified by the creative student and the convergent thinker as exemplified by the high I.Q. student should be differentiated.

Thorndike (20) carried the point one step further in his report on the measurement of creativity. He found that the correlations between the sub-tests of creativity were very low.

Friess (7) directs his attention to the industrial implication of creativity as analyzed by one of the pioneers in this field, The A.C. Spark Plug Division. Their program emphasizes identification, placement, distribution, and training of creative talent. Testing is directed primarily at imagination, but flexibility, ideational fluency, problem sensitivity, and originality are considered as well. The training program is designed to teach what creativity is, how to recognize it, what drives and motivations are involved, and how to use problem solving techniques such as check lists, brainstorming (unconventional group solutions to real problems), problem analysis, and the technique of hypothetical situations (Professor Arnold's Arcturus IV project on conventional solutions to "What if" unreal problems). The A.C. Spark Plug Division uses rewards of recognition, commendation, and provisions for time and space to practice and pursue creativity, as well as continuous encouragement, and creativity oriented supervision.

Another authority on creativity in industry, Eugene K. Von Fange (22), conducted year-long classes in creative engineering for the General Electric Company. General Electric and a number of other industries had long been aware of the lack of creative thinkers among its engineers and especially among its employees who were recent college graduates. Von Fange's experience indicated that,

> The lack of original contributions is not due to the absence of imagination or conceptual power in the population. It is rather that our habit reflexes and conforming attitudes so bind our thinking and misdirect or ignore our conceptual power that we are limited to only a few traditional patterns of thought on our job.

He concluded that although a high I.Q. was not necessarily a prerequisite to creativity, an independence of thought was.

Meanwhile in the classroom, Torrance (21) was concentrating on the transfer of training effect from one mode of creativity to another.

In his experiment, children who were given intensive training in creative thinking for four months showed transfer effects in creative writing.

Taylor (19) investigated the effects of censure on students' creativity. It was in part the decrement in creativity found as the result of censure that led to the assumption in this present study that negative experience would result in an inhibitory effect.

Another approach to divergent thinking research can be found with Eisner's (6) consideration of the development of creativity in the classroom. He reports a correlation of creativity to intelligence to be +.26. Eisner further reports that creative thinking can be decreased by creating anxiety, by curtailing fantasy, and by increasing dependence on authority. Mental illness was found to hamper creativity. He characterizes the creative individual as: (1) aesthetic; (2) a boundary pusher; (3) a boundary breaker; and (4) inventive.

Parnes (16) concludes from his extensive review of recent research that,

> The gap between an individual's innate creative talent and his lesser actual creative output can be narrowed by deliberate education in creative thinking.

Thus it appears that in industry and in the classroom the individual's creative product can be increased over a period of time by providing the subject appropriate education and training.

In the subsequent chapters attention is directed toward whether the productivity of divergent thinking can be modified on a short term, immediate basis not involving prolonged external censure, reward, training, or education.

CHAPTER II

PROCEDURE

The Sample

Three hundred and sixty-two University of South Florida students were utilized in this research. Entire classes were tested to avoid biasing the sample by using only volunteers. Approximately 72 per cent of the primary sample were freshmen and 18 per cent were sophomores; the remainder were seniors, juniors or unclassified. The modal age was eighteen. The age range selected was seventeen to twenty-five.

In the primary analysis only two hundred and forty scores were needed, but three hundred and thirty basic instruments were administered. To provide six females and six males per cell of the experimental design, sixty-six subjects were randomly eliminated. Twenty subjects were eliminated because they were over age or because they failed to follow the instructions in completing the instruments. Two subjects arrived after testing had commenced. They were permitted to administer and time their own test, but the scores were not considered valid. Two subjects belonged to two of the classes utilized. Accordingly, their second testing was voided. Validation of the independence of the research "Experiences" relative to one another accounted for another thirty-two subjects, bringing the total to three hundred and sixty-two for the total research.

The Instrument

The primary instrument was composed of the twenty possible combinations of the four "Experiences" (Appendix B) and the five "Divergent Tasks" (Appendix A). General Information and Instructions (Appendix C) constituted the cover page for each of the twenty combinations.

The four selected "Experiences" were:

1. A positive experience
2. A negative experience
3. A memory experience
4. A reorienting divergent experience

The positive experience used in the research was that resulting from the response of the subject to the request:

> Please describe below the most rewarding, memorable, pleasant, positive experience of your life, using as vivid and fluent expressions as possible. You can be reassured that not only is your identity not known but that professional confidentiality is guaranteed. You are requested to continue your reporting of this experience for the full period of eight minutes.

In similar fashion, the negative experience was that resulting while responding to the request:

> Please describe below the most disrupting, threatening, anxiety-ridden, negative experience of your life using as vivid and fluent expressions as possible. You can be reassured that not only is your identity not known but that strict confidentiality is guaranteed. You are requested to continue your reporting of this experience for the full period of eight minutes.

The memory experience consisted of committing ten consonant consonant consonant nonsense syllables (25) to memory in the order given. Since an objective of this experiment was to measure the effect of memorization, it would be inappropriate to discharge the memory set prior to the administration of the divergent task. Since the response to a test of memory would not necessarily measure the extent of involvement in the experience, no test of the memorization was attempted following the divergent task.

The reorienting divergent experience was similar to those subsequently to be discussed as tasks. In this instance, the subject was asked to draw and label as many meaningful designs as possible using four straight lines. These responses were not evaluated; they were included as a divergent task in order to determine whether creative productivity, as an "Experience," facilitates a contiguous but different divergent thinking task. This reorienting divergent experience, being of a figural nature, was in this respect different from the other divergent tasks, and accordingly it was selected for this phase of the research.

Each of the four selected "Experiences" lasted eight minutes.

The five "Divergent Tasks" of this research were chosen from those isolated by Guilford (11) and used in much of the current investigation conducted on divergent thinking:

1. Spontaneous flexibility
2. Ideational fluency
3. Associational fluency
4. Expressional fluency
5. Word fluency

A sample of these tasks as administered are included as Appendix A. In Appendix D these tasks are described using Guilford's classifications (11) which resulted from his factor analysis of "Intellect." Guilford grouped the fourteen factors he found into the following three dimensions:

1. Intellectual operations
    a. Divergent
    b. Convergent
    c. Cognitions
    d. Memory
    e. Evaluation
2. Products
    a. Units
    b. Classes
    c. Relations
    d. Systems
    e. Transformations
    f. Implications
3. Contents
    a. Figural
    b. Symbolic
    c. Semantic

The scores obtained on the five "Divergent Tasks" constituted the data for the primary analysis of this research. The "Product" dimension indicated above and in Appendix D was the criterion used in the evaluation of the responses to the respective test items as applicable. Detailed scoring criteria are provided in Appendix F.

Reliability and Validity

Christensen and Guilford (4), in reporting on the construct validity of the four categories of fluency tests: ideational, word, expressional, and associational, state that,

> Validity for measuring the factors may be accepted on the basis that essentially alternate forms were found substantially related to their respective factors.

Some evidence on concurrent validity was reported by Torrance (21) for various tests of creativity including the Unusual Uses tests which differ from the spontaneous flexibility item of this study only in that tin cans and books were used instead of bricks. The sample used was composed of saleswomen thirty years of age or older. The criteria selected were sales productivity and customer service. By these criteria, the more creative individuals were found to score significantly higher on the tests administered than the less creative.

Wilson, et al.(23) in their manual on the Alternate Uses tests reported that factor loadings for spontaneous flexibility have been found between .31 and .52. Alternate form reliability based on administration to high I.Q. samples varied from .68 to .81.

Christensen and Guilford (4) report reliability based on correlations of alternate forms of the tests to be:

1. Word fluency (.75)
2. Ideational fluency (.76)
3. Associational fluency (.63)

Administration of the Instrument

The primary instrument was administered in a classroom to groups varying in size from thirty to one hundred and sixty-five. An attempt was made to present an equal representation of the twenty different experience-task instrument combinations in each administration. No apparent extra-experimental diversions were observed.

When all subjects were seated the instruments were distributed, and the subjects were requested to record on the instruction sheet their age, sex, and college status. The subjects were then asked to read the General Information and Instructions (Appendix C) while the administrator read them aloud. Following this the subjects again were cautioned not to write their names anywhere on the instrument. At this point questions were solicited and answered as simply and briefly as possible.

A stand-by signal was given five seconds before beginning the testing. At the appropriate time instructions were given to commence by reading page 2 which contained the assigned "Divergent Task." After the allotted thirty seconds, the subjects were directed to turn to and complete page 3 which contained one of the four "Experiences." After eight minutes, subjects were directed to return to page 2 and commence working on the "Divergent Task." At the completion of eight minutes on these tasks, time was called and all instruments were returned to the administrator for subsequent scoring and grouping by divergent tasks.

In addition to the administration of the primary instrument it was considered necessary to establish the independence of the "Experiences" relative to one another. This was accomplished with thirty-two other University of South Florida students. Each subject was given all four "Experiences" and requested to match them with the four descriptive titles: positive experience, negative experience, memory experience, and reorienting divergent experience. The probability of occurrence of the results found were determined using the binomial test (17).

Analysis of Data

Using the data as entered in the appropriate cells of the Experimental Design (Appendix E), a complex analysis of variance (double classification model) was executed in accordance with the variance schema design as recommended by McNemar (14).

The appropriate denominator for F_r, F_c and F_{rc} was S^2_w since this analysis involved a fixed constants model with m scores (m persons) per cell and a total of m RC individuals. In an attempt to locate the source of the interaction variance, a simple analysis of variance was run for each column, and a t-test was conducted between the most deviant means of any divergent task found to have significant variance (between-groups) thereof. When a significant t was found, another t-test was run between the next two most deviant means until no further significance was located. A similar posteriori test was made for each column using Duncan's procedure with conversions of protection levels to a .05 level of significance as modified by Scheffé (24). The .05 level of significance was selected for all computations. Homogeniety of variance was tested using Bartlett's test (24).

An extension of the proposal was made in order to investigate the conditions which resulted in the negative experiences being less inhibitive of divergent thinking than the positive experiences. To accomplish this an analysis was made of the differences between the divergent scores paired with the most and least traumatic negative experiences. This was accomplished by having three judges rate all experiences on a scale from 1 (for least traumatic) to 5 (for most traumatic). Judges were instructed to use, as a criterion, the estimated level of affective reaction of the subject at the time of describing the experience, not at the time of its original occurrence. Subjects whose average rating by the judges on their experience was closer to 3 than to 2 or 4 were discarded. The Mann-Whitney U formulation and probability table (17) were used to arrive at the probability of occurrence of the pairings found as described above.

Analyses and interpretations supplementary to the stated purpose of the dissertation are made in Appendix G.

CHAPTER III

ANALYSIS OF VARIANCE FINDINGS AND INTERPRETATIONS

Major Findings

Using the formula from McNemar (14) for the analysis of variance (double classification with more than one score per cell), the data yield the variance schema Table 1. Table 1 also presents the F scores and their significance.

The row variance ratio for this sample as tested is found to be significant at the .12 level. This does not satisfy the established .05 significance level. It therefore can not be said that the statistics of this specific sample demonstrate that the selected experiences differentially influence the creative product of the divergent tasks employed.

Although the column variance ratio is significant at the .001 level, a scoring artifact prevents interpretation of this information.

The interaction variance ratio is found to reach the .03 level of significance. In order to permit more meaningful interpretation of this acceptable significance, additional analysis is considered warranted. A simple analysis of variance on each of the columns of the experimental design yields a significant F for the ideational fluency tasks only. Within this column, the most divergent means are those for memory and reorienting divergent experiences. A significant "t" beyond the .02 level is found in the comparison of these two means while a "t" significant beyond the .03 level is found for the comparison of means for memory versus negative experiences. The comparison of memory and

TABLE 1

VARIANCE

Source	Sum of Squares	df	Variance Estimate	Ratio	Results	Probability of Occurrence
Rows	142.566	3	47.522	s^2_r / s^2_w	1.988	.12
Columns	12,516.391	4	3,129.098	s^2_c / s^2_w	131.601	.001
Interaction	538.977	12	44.915	s^2_{rc} / s^2_w	1.889	.03
Within Cells	5,231.000	220	23.777			
Total	18,428.934	239				

positive experience however does not reach the .05 level. Duncan's posteriori test as modified by Scheffé yields a .05 level of significance only under the ideational fluency task for the most deviant means as previously located; i.e. memory versus reorienting divergent task. Bartlett's (24) test of homogeneity of variance yields a chi square which does not reach a p of .05, and is therefore not significant. Consequently, the hypothesis that the groups involved have been drawn from populations having equal variances can be accepted.

In the interpretation of these significant and nonsignificant t's and F's which are used to locate sources of interaction variance, the possibility of various combinations of type I and II errors must be realized. Within these limitations, it can be reported that interaction does exist. It can be stated that memory experiences have a significantly greater influence on the ideational fluency form of divergent thinking than that which results from the interaction of the reorienting divergent experience or the negative experience with ideational fluency in this experiment. Only in this respect can it be said that the analysis supports the hypothesis of this study.

Supplementary Hypotheses

In Chapter I hypotheses are made as to whether the selected experiences facilitate or inhibit associated divergent thinking operations. Since the row variance is not significant, interpretations about an assumed direction of variance are not warranted without further analysis. Accordingly, as Table 2 points up, all the scores for divergent tasks associated with negative experiences exceed the mean score for the respective divergent task column. Also in every instance, scores

TABLE 2

RELATIONSHIP OF CELL MEANS TO RESPECTIVE MEANS OF DIVERGENT TASK COLUMNS

Experiences	Divergent Tasks				
	Spontaneous Flexibility	Ideational Fluency	Associational Fluency	Expressional Fluency	Word Fluency
Positive	+	+	+	-	-
Negative	+	+	+	+	+
Memory	-	-	-	+	+
Reorienting Divergent	+	+	-	-	-
Mean	6.08	20.042	10.688	5.85	21.67

TABLE 3

COMPARISON OF DIVERGENT TASK SCORES ASSOCIATED WITH MOST TRAUMATIC NEGATIVE EXPERIENCES AGAINST THOSE WHICH ARE LEAST TRAUMATIC

Divergent Task	Associated (–) Experiences		Probability
	Most Trauma	Least Trauma	Most versus Least
Spontaneous Flexibility	5.9	7.0	.178
Ideational Fluency	17.0	28.0	.016
Associational Fluency	6.7	19.0	.200
Expressional Fluency	7.4	4.9	–.194
Word Fluency	19.0	26.5	.194

associated with negative experiences exceed those scores associated with positive experiences. Since significance is not reached, no interpretation is possible. In a search for interpretable results, an analysis is made of the difference between the divergent scores paired with the most traumatic negative experiences and those paired with the least traumatic negative experiences. Table 3 tabulates means for the divergent task scores affiliated with the most versus the least traumatizing experiences.

The last column of Table 3 lists the probability associated with the occurrence under H_0 of any Mann-Whitney U determined from the data in columns one and two based on a two tailed assumption. For four out of five divergent thinking tasks, the probability is at least four out of five that a more traumatic negative experience causes less creativity than a less traumatic experience.

On the other hand, a similar analysis of divergent tasks scores associated with the most and the least positive experiences yields significant results only for spontaneous flexibility beyond the .05 level. In this one instance the higher positive experience yields an increased creative product.

Prerequisite Assumption

As indicated on page 17, a separate sampling of University of South Florida students was selected to validate the assumption of independence of the four "Experiences" relative to one another. Thirty of the thirty-two students matched each of the four "Experience" instruments with the appropriate designation. Using the binomial test (17), the probability of such an occurrence by chance was found to be smaller than .01.

CHAPTER IV

SUMMARY AND CONCLUSIONS

From the findings, as elaborated in the previous pages and the following appendices, certain conclusions are derived. Caution must be employed in their generalization to any single group whether it is included in the population sampled or not.

The hypothesis that there is a significant difference in the creative product of five representative "Divergent Tasks" derived both individually and collectively from the effect of four selected intervening "Experiences" can not be accepted. Although the creative products collectively considered by "Experiences" (rows) do not significantly differ, the hypothesis can be accepted in part since the creative product of ideational fluency tasks associated with memory experiences considered individually, significantly differs from the creative product of ideational fluency associated with either the negative or reorienting divergent experiences considered individually.

The hypothesized directions of row effects are only partly supported by the data. The analysis of variance does not support the assumptions that memorization and negative experiences inhibit while positive experiences facilitate divergent thinking. However, an analysis of scores of subjects rated as having the most traumatic negative experiences evidences a lower creative productivity than subjects rated as having the least traumatic experiences. From this it may be inferred that experimentation with considerably greater trauma involved would produce inhibitory effects on divergent thinking. It is postulated that the level of experience administered may have produced significance had the sample been drawn from a less emotionally stable population.

Since a similar supplementary analysis made with positive experiences yielded conflicting and generally nonsignificant results, no statement in this regard is made.

In order to reach a realistic conclusion, it is necessary to integrate the findings of the related studies with one another and with those of this study as applicable.

Getzels and Jackson (8) stress the need for distinguishing between convergent and divergent thinkers. Thorndike (20) reports that the subtests of creativity have a low intercorrelation. Guilford (11) by the very factorial nature of his research indicates the uniqueness of each classification of divergent thinking. Similarly the data of the study of this dissertation do not yield any evidence to warrant indiscriminant grouping of all types of divergent thinking. It is concluded that not only should creativity and intelligence be differentiated, but also divergent thinking should be distinguished from other forms of creativity. Further research is indicated to investigate relationships between the different classifications of divergent tasks.

To the degree that positive experience constitutes a reward, the Friess (7) report on industry led to a prediction that positive experience would facilitate divergent thinking. Since this did not materialize here, it was assumed that the positive experience of this study was inadequate as a reward.

Research projects of Barron (1), Drevdahl and Cattell (5), Guilford, et al. (9), and Merrifield, et al. (15) demonstrate that creativity is correlated with various personality traits and interests. On the other hand, in this research paper, a report is made of an effort to temporarily modify these relatively permanent personality variables by the four "Experiences" in order to determine whether or not any temporary facilitation or inhibition will come about in divergent thinking. The data obtained do not support this hypothesis. However, the level of significance reached for row variance ($F = .12$) is sufficient to permit postulating that modification of the sample, the methodology or the design could result in significance.

Reference to the F tables demonstrates that merely increasing the sample size would have negligible effect on the lowering of the significant value. Increasing n_2 from 220 to infinity for an n_1 of 3 at the .05 level of significance lowers the table value of F only .05. However, increasing n_1 to 8 by adding more experiences would lower the table value of F to 1.99 which would make the acquired row variance significant at the .05 level. Therefore, adding more rows (experiences) also appears to be an appropriate modification of the research.

In Appendix G a report is made on findings supplementary to the proposal of this dissertation. It is concluded from these findings that no significant difference at the .05 level exists between the male and female scores for divergent thinking in the sample. In view of the above, and since a sample from the same population containing eight females and six males per cell yields a significant row variance,the possibility of a type I error takes on increased importance.

Based on the above conclusions, it is suggested that further research should include the following modifications: (1) eight "Experiences" instead of four; (2) stronger positive and negative

"Experiences"; (3) a larger sample from a more diverse population particularly relative to age range and emotional stability; and (4) two "Divergent Tasks" in lieu of five, one being spontaneous flexibility and the other being word fluency.

APPENDIX A

SAMPLES OF FIVE DIVERGENT TASKS

SPONTANEOUS FLEXIBILITY

List as many different uses as you can for a "Brick." Your score will be the total number of non-repeated items.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

USE BACK IF NECESSARY

DO NOT TURN TO PAGE 3 UNTIL INSTRUCTED

IDEATIONAL FLUENCY

List as many different objects as possible that are generally round and edible. Repeated or inclusive items will not be credited to your total score. For example, "Nuts," "Walnuts," and "Pecan Nuts" will be scored as only one correct response.

1.

2.

3.

4.

5.

6.

7.

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9.

10.

11.

12.

13.

14.

15.

16.

17.

USE BACK IF NECESSARY

DO NOT TURN TO PAGE 3 UNTIL INSTRUCTED

ASSOCIATIONAL FLUENCY

List as many different words as possible meaning the approximate opposite of "POOR."

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.

USE BACK IF NECESSARY

DO NOT TURN TO PAGE 3 UNTIL INSTRUCTED

EXPRESSIONAL FLUENCY

Write as many different sentences as possible of four words each with the first letters in the order as given. All sentences must:

A. Make sense.
B. Be complete.
C. Not repeat any word used previously.

1. W__________ C__________ A__________ P__________
2. W__________ C__________ A__________ P__________
3. W__________ C__________ A__________ P__________
4. W__________ C__________ A__________ P__________
5. W__________ C__________ A__________ P__________
6. W__________ C__________ A__________ P__________
7. W__________ C__________ A__________ P__________
8. W__________ C__________ A__________ P__________
9. W__________ C__________ A__________ P__________
10. W__________ C__________ A__________ P__________
11. W__________ C__________ A__________ P__________
12. W__________ C__________ A__________ P__________
13. W__________ C__________ A__________ P__________
14. W__________ C__________ A__________ P__________
15. W__________ C__________ A__________ P__________
16. W__________ C__________ A__________ P__________

USE BACK IF NECESSARY

DO NOT TURN TO PAGE 3 UNTIL INSTRUCTED

WORD FLUENCY

List as many different words as you can ending in "ate." Repeats of the same word will not be scored as correct.

1.

2.

3.

4.

5.

6.

7.

8.

9.

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12.

13.

14.

15.

16.

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18.

USE BACK IF NECESSARY

DO NOT TURN TO PAGE 3 UNTIL INSTRUCTED

APPENDIX B

SAMPLES OF FOUR SELECTED EXPERIENCES

SAMPLE

POSITIVE EXPERIENCE

Please describe below the most rewarding, memorable, pleasant, positive experience of your life, using as vivid and fluent expressions as possible. You can be reassured that not only is your identity not known, but that strict professional confidentiality is guaranteed. You are requested to continue your reporting of this experience for the full period of eight minutes.

USE BACK IF NECESSARY

PLEASE DO NOT RETURN TO PAGE 2 UNTIL INSTRUCTED

SAMPLE

NEGATIVE EXPERIENCE

Please describe below the most disrupting, threatening, anxiety-ridden, negative experience of your life, using as vivid and fluent expressions as possible. You can be reassured that not only is your identity not known, but that strict confidentiality is guaranteed. You are requested to continue your reporting of this experience for the full period of eight minutes.

USE BACK IF NECESSARY

PLEASE DO NOT RETURN TO PAGE 2 UNTIL INSTRUCTED

SAMPLE

MEMORY EXPERIENCE

Please commit the following to memory in the order given, continuing your memorization for the full period of eight minutes.

CFX VGB NQX PJW LMG

MBK YKF RPD QMT HDJ

USE BACK IF NECESSARY

PLEASE DO NOT RETURN TO PAGE 2 UNTIL INSTRUCTED

SAMPLE

REORIENTING DIVERGENT EXPERIENCE

Draw and label as many meaningful designs as possible utilizing four straight lines.

Example: chair

Please continue your efforts for the full period of eight minutes.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

USE BACK IF NECESSARY

PLEASE DO NOT RETURN TO PAGE 2 UNTIL INSTRUCTED

APPENDIX C

SAMPLE OF

GENERAL INFORMATION AND INSTRUCTIONS

This research project is composed of (a) a test of creativity (p.2) and (b) an exercise designed to initiate an intellectual or emotional experience (p.3). The purpose of this research is to determine whether different forms of intellectual and emotional experiences differentially influence one's creative ability. In order to encourage maximum involvement on your part, no names are solicited, and professional confidentiality is guaranteed for all responses.

Since other groups of students will be subsequently tested, and since knowledge of the nature of your participations will influence the productivity of subsequent participants, you are requested to restrain from the discussion of the tasks and experiences involved.

When instructed by the administrator, turn to page 2 and read and digest the task assigned for 30 seconds, WITHOUT RECORDING ANY RESPONSES. On a subsequent signal from the administrator, turn to and complete the intervening experience requested on page 3. Please utilize the full period of eight (8) minutes. The administrator will indicate the termination of this experience at which time you will return to page 2 and complete the original creative task. Again, you are requested to utilize the full eight minutes.

PLEASE DO NOT TURN THIS PAGE UNTIL INSTRUCTED

APPENDIX D

DIVERGENT TASK DESCRIPTION AND CLASSIFICATION

Divergent Task Designation	Intellectual Classification, Guilford (11)			Item
	Operations	Products	Contents	
1. Spontaneous Flexibility	Divergent Thinking	Classes	Semantic	List as many uses as you can for a "Brick."
2. Ideational Fluency	Divergent Thinking	Units	Semantic	List as many different objects as possible that are generally round and edible.
3. Associational Fluency	Divergent Thinking	Relations	Semantic	List as many words as possible meaning the approximate opposite of "poor."
4. Expressional Fluency	Divergent Thinking	Systems	Symbolic	Given the following initial letters of words, make as many sentences or phrases as possible. W__________ C__________ A__________ P__________
5. Word Fluency	Divergent Thinking	Units	Symbolic	List as many different words as you can ending in "ate."

Note: Guilford's (11) factor analysis of intellect yielded fourteen factors which were grouped into: (1) Operations (divergent, convergent, cognition, memory, and evaluation); (2) Products(units, classes, relations, systems, transformations, and implications); (3) Contents(figural, symbolic, semantic). Behavior was added to contents on a theoretical basis to represent social intelligence.

APPENDIX E

EXPERIMENTAL DESIGN

Intervening Experiences	Divergent Tasks				
	Spontaneous Flexibility	Ideational Fluency	Associational Fluency	Expressional Fluency	Word Fluency
Positive Experience					
Negative Experience					
Memorizing Experience			6 Males and 6 Females per cell		
Reorienting Divergent Experience					

APPENDIX F

SCORING CRITERIA

Spontaneous Flexibility was scored using classes as reported by Smith (18), a University of Illinois research assistant on the U.S. Office of Education Research Project Productive Thinking of Gifted Children (James J. Gallagher, Principle Investigator):

1. Construction
2. Support
3. Pavement
4. Recreation
5. Weapons
6. Decoration
7. Weight
8. Miscellaneous

One point was given the subject for each class in which a response fell. A maximum of eight points was possible.

The four fluency tests were scored using the Christensen-Guilford(4) manual for fluency tests. General rules were as follows:

1. Word Fluency - a word was not acceptable if it:
    a. Did not contain the specified letter.
    b. Was not a recognizable word (misspelling in itself was not disqualifying).
    c. Duplicated a word previously given.
    d. Was a different form of the same word.

2. Ideational Fluency - a response was not acceptable if it:
   a. Repeated an examinee's previous response or the test example given.
   b. Was a class name given along with a specific object. For example "fruits" was not counted if any specific fruit such as "apple" was given.

Responses were considered acceptable as far as satisfying the criteria "round" as long as any cross section was generally round.

3. Associational Fluency - any one of a number of connotations of the stimulus word was acceptable, but the response was unacceptable if it bore no recognizable relation to the stimulus word. A list of unacceptable words was developed in the first scoring which was used in rescoring for record.

4. Expressional Fluency - four specifications must be satisfied for each response as follows:
   a. Contain four words.
   b. Be a complete sentence.
   c. Make sense.
   d. Contain the specified initial letters.

APPENDIX G

SUPPLEMENTARY FINDINGS

Male versus Female as Divergent Thinkers

As discussed in Chapter I, some researchers have concluded that creativity and divergent thinking are higher in females than in males. This study does not support this conclusion. Table 4 compares the female mean of each cell with the male counterpart. Table 5 is merely a simplified version of Table 4. The female mean exceeds that of the male in ten of the twenty cells, and the converse is true in eight cells. However, in the comparison of the female and the male means for each divergent task, the male means exceed the female means for ideational fluency, associational fluency, and word fluency, while a reverse condition is found for spontaneous flexibility and expressional fluency. None of the column male and female means when subjected to a t-test is found to be significantly different at the .05 level. Therefore it cannot even be stated that females excel on some forms of divergent tasks while males excel on other forms.

In Table 4 the scores for row 6 (mixed divergent experiences) were obtained from thirty subjects in a University of South Florida class in child psychology. This effort was extraneous to that of the proposal of this study. Sixteen females and fourteen males constituted this sample. All of these subjects were administered all five divergent tasks consecutively with eight minutes given to each task. No two subjects received the divergent tasks in the same order, but each

TABLE 4

COMPARISON OF FEMALE AND MALE MEANS BY CELLS AND COLUMNS

	Divergent Tasks									
Experiences	Spontaneous Flexibility		Ideational Fluency		Associational Fluency		Expressional Fluency		Word Fluency	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Positive (n_f=n_m=6)	7.0	5.3	21.2	24.0	9.8	12.3	5.7	5.2	21.2	18.7
Negative (n_f=n_m=6)	6.5	6.5	23.3	23.3	11.8	12.8	7.2	5.2	21.3	27.8
Memory (n_f=n_m=6)	4.7	6.0	18.7	17.5	8.3	10.5	8.0	5.8	22.2	25.3
Reorienting Divergent (n_f=n_m=6)	6.8	5.8	22.5	25.8	10.3	9.5	5.2	4.7	18.7	18.2
Total (n_f=n_m=24)	6.2	5.9	21.4	22.7	10.1	11.3	6.5	5.2	20.8	22.5
Mixed Divergent (n_f=16, n_m=14)	6.0	6.2	22.8	18.5	8.3	7.6	5.4	6.6	22.5	23.0

TABLE 5

ORDINAL COMPARISON OF FEMALE AND MALE MEANS

BY CELLS AND COLUMNS

Experiences	Divergent Tasks				
	Spontaneous Flexibility	Ideational Fluency	Associational Fluency	Expressional Fluency	Word Fluency
1. Positive	F	M	M	F	F
2. Negative	0	0	M	F	M
3. Memory	M	F	M	F	M
4. Reorienting Divergent	F	M	F	F	F
5. Total	F	M	M	F	M
6. Mixed Divergent	M	F	F	M	M

task appeared six times in each of the five possible positions as indicated by Table 6.

As illustrated in Table 4, the opposite sex acquired the higher creative product in row 5 than was the case in row 6, except that the males exceeded the females in both rows in the instance of word fluency. This reversal decreases still further the likelihood that sex influences the creative product for the five selected "Divergent Tasks."

Type I and Type II Errors

Another issue which can be considered is the matter of a type I error (false rejection). A variation of the primary research may provide some limited indication in this regard. In the variation referred to as the alternate sample in Table 7, an 8/6 female-male ratio was utilized on the grounds that this was the approximate ratio found in the sample tested. In this instance the row variance ratio was significant at the .05 level. Obviously, these findings are not compatible with those of the primary research. This could be attributed to a type I error in the primary research or a type II error in the alternate research. Without further research there is no way to determine which in fact is true.

A Supplementary View of Interaction Variance

In Chapter III significant interaction variance is reported, and a source thereof is also located. Nonsignificant variance has no interpretable value to this report; nevertheless, an overall view of the interaction variance is considered as having some interest value. Guilford (10) proposes that row and column variance can be removed from the original matrix, leaving interaction variance only. Applying his

TABLE 6

ORDER OF PRESENTATION OF DIVERGENT TASKS FOR CONTIGUOUS ADMINISTRATION

	Order of Test Administration				
Subject	1st	2nd	3rd	4th	5th
1.	S.F.	I.F.	A.F.	E.F.	W.F.
2.	S.F.	I.F.	E.F.	A.F.	W.F.
3.	S.F.	A.F.	I.F.	E.F.	W.F.
4.	S.F.	A.F.	E.F.	I.F.	W.F.
5.	S.F.	E.F.	A.F.	I.F.	W.F.
6.	S.F.	E.F.	I.F.	A.F.	W.F.
7.	I.F.	A.F.	E.F.	W.F.	S.F.
8.	I.F.	A.F.	W.F.	E.F.	S.F.
9.	I.F.	E.F.	A.F.	W.F.	S.F.
10.	I.F.	E.F.	W.F.	A.F.	S.F.
11.	I.F.	W.F.	A.F.	S.F.	S.F.
12.	I.F.	W.F.	E.F.	A.F.	S.F.
13.	A.F.	E.F.	W.F.	S.F.	I.F.
14.	A.F.	E.F.	S.F.	W.F.	I.F.
15.	A.F.	W.F.	E.F.	S.F.	I.F.
16.	A.F.	W.F.	S.F.	E.F.	I.F.
17.	A.F.	S.F.	W.F.	E.F.	I.F.
18.	A.F.	S.F.	E.F.	W.F.	I.F.
19.	E.F.	W.F.	S.F.	I.F.	A.F.
20.	E.F.	W.F.	I.F.	S.F.	A.F.
21.	E.F.	S.F.	W.F.	I.F.	A.F.
22.	E.F.	S.F.	I.F.	W.F.	A.F.
23.	E.F.	I.F.	W.F.	S.F.	A.F.
24.	E.F.	I.F.	S.F.	W.F.	A.F.
25.	W.F.	S.F.	I.F.	A.F.	E.F.
26.	W.F.	S.F.	A.F.	I.F.	E.F.
27.	W.F.	I.F.	S.F.	A.F.	E.F.
28.	W.F.	I.F.	A.F.	S.F.	E.F.
29.	W.F.	A.F.	I.F.	S.F.	E.F.
30.	W.F.	A.F.	S.F.	I.F.	E.F.

TABLE 7

COMPARISON OF ROW VARIANCE (EXPERIENCES) FOR TWO VARIATIONS OF THE SAMPLE

Sample	Female/Male Ratio	F_r	.05 Level of Significance
Primary	6/6 (Total of 12 per cell)	1.998	2.65
Alternate	8/6 (Total of 12 per cell)	3.348	2.63

TABLE 8

ROW AND COLUMN VARIANCE REMOVED FROM THE CELL MEANS OF THE ORIGINAL MATRIX

Experiences	Divergent Tasks					
	Spontaneous Flexibility	Ideational Fluency	Associational Fluency	Expressional Fluency	Word Fluency	Row Variance
Positive	13.56	14.0	13.86	13.04	11.72	+0.2
Negative	12.37	13.23	13.59	12.27	14.86	-1.32
Memorization	13.09	9.87	12.57	14.91	15.92	+ .57
Reorienting Divergent	14.04	15.91	13.00	12.86	10.54	+ .52
Column Variance	+7.19	-8.78	+2.58	+7.42	-8.4	Grand Mean 13.26

method to the cell means of the original matrix in Appendix I, the results as portrayed in Table 8 are found. It can be noted that the cell represented by the intersection of the memory experience and the ideational fluency tasks is the most deviant from the grand mean of Table 8. This coincides with the findings from the analysis as reported in Chapter III. Since this method of removing row and column variance also removes the variance due to the scoring artifact, an interesting comparison of the amount of variance of other cells from the grand mean can be made.

APPENDIX H

DEFINITIONS

Examples of the "Experiences" and "Divergent Tasks" may also be found in Appendices A, B, and D.

1. Adaptive flexibility - divergent production of as many ideas as possible within a single class which are needed to solve a problem (11).
2. Associational fluency - a unique ability for the intellectual production of a variety of things related in a specified way to a given thing (11).
3. Convergent thinking - intellectualization in which the information leads to one right answer or to a recognized best or conventional answer (11).
4. Divergent thinking - intellectualization proceeding in different directions, sometimes searching, sometimes seeking variety (11).
5. Expressional fluency - rapid intellectual formation of systems (symbolic, semantic and figural) (11).
6. Evaluation - reaching decisions as to goodness, correctness, suitability or adequacy of what we know, what we remember, and what we produce in productive thinking (11).
7. Figural units - concrete material as is perceived through the senses which constitute the medium or content of intellectual operations (11).

8. Ideational fluency - the semantic ability to intellectually produce a multiplicity of similar units (11).
9. Intervening variable - any variable connected functionally with a preceding and a following variable, frequently relates stimulus and response variables (13).
10. Nonsense syllables - a pronounceable combination of letters that has no meaning in the language of the user (13).
11. Originality - obsolescent terms now recognized as the ability to produce a variety of transformations or reinterpretations(11).
12. Plot titles test - a test of originality requiring the subject to list as many titles as possible for a short story (11).
13. Semantic units - verbal meanings or ideas utilized as the medium or material of intellectual operations (11).
14. Spontaneous flexibility - divergent production of many different classes of ideas (11).
15. Symbolic units - letters, digits, and other conventional signs usually organized in general systems, such as the alphabet or number system, which are utilized as the medium or materials of intellectual operations.
16. Transformation - redefinition abilities (11).
17. Word fluency - facility of intellectual production of symbolic units (11).

The following terms are designations assigned to actual or vicarious "experiences" operationally employed in the context of the experimental design, therefore the items in Appendix B can be considered to be an operational definition of these items.

18. Positive experience as operationally defined in Appendix B.

19. Negative experience as operationally defined in Appendix B.

20. Memorization experience as operationally defined in Appendix B.

21. Reorienting divergent experience - Since the primary tasks are also divergent in nature, and, since this experience is an intervening diversion on the intellectual direction of the primary task, it has been differentiated by the prefix "reorienting." It deals with a figural production of systems (11).

APPENDIX I

SUMS AND MEANS

Experiences		Divergent Tasks					Totals
		S.F.*	I.F.*	A.F.*	E.F.*	W.F.*	
Positive	Sum x	74	271	133	65	239	782
	Sum x^2	478	6245	1715	439	5125	14,002
	Mean	6.166	22.583	11.083	5.416	19.916	
Negative	Sum x	78	280	148	74	295	875
	Sum x^2	526	7066	2418	530	7933	18,473
	Mean	6.500	23.333	12.333	6.166	24.583	
Memorization	Sum x	64	217	113	83	285	762
	Sum x^2	358	4133	1271	763	7191	13,716
	Mean	5.333	18.083	9.416	6.916	23.750	
Reorienting Divergent	Sum x	76	290	119	59	221	765
	Sum x^2	490	7430	1293	329	4937	14,479
	Mean	6.333	24.166	9.900	4.916	18.416	
Totals	Sum x	292	1,058	513	281	1,040	
	Sum x^2	1,852	24,874	6,697	2,061	25,186	
	Mean	6.050	22.000	10.683	5.849	21.666	

* S.F. Spontaneous flexibility I.F. Ideational fluency A.F. Associational Fluency
E.F. Expressional fluency W.F. Word fluency

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BIOGRAPHICAL SKETCH

Edmund Elmer Allen was born on August 2, 1919 in Oneida, New York. He received a B.S. in C.E. degree as valedictorian of the class of 1941 from Norwich University and simultaneously was commissioned a second lieutenant in the cavalry in the Army of the United States. Following two months active duty with the Army, he received a regular commission in the United States Marine Corps from which he retired after serving twenty years. During this period he commanded all sizes of artillery units from a platoon to a regiment. Ten years of his career were occupied with duties as an instructor, or supervisor thereof, including an assignment as Associate Professor of Naval Science at Rensselaer Polytechnic Institue. In 1958, he received a Masters Degree in Education from Birmingham Southern College. An article based on his master's thesis, "Factors in Religious Attitudes of Older Adolescents," was published in Volume 55 of the Journal of Social Psychology. All course work toward the Doctorate in Education, including a full minor in Psychology plus a cognate minor in Rehabilitation Counseling, was completed at the University of Florida, while his counseling internship was executed at the Counseling Service, University of South Florida. In April 1964, he received the degree of Doctor of Education. Mr. Allen was president of Norwich University's academic honorary society, Epsilon Tau Sigma, and is a member of Psi Chi, Kappa Delta Pi, Phi Delta Kappa and the National Rehabilitation Association. Mr. Allen is married to the former Miss Ruth Strachen of Elmira, New York and they have five children.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

April, 1964

J. B. White
Dean, College of Education

Dean, Graduate School

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